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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

FOREST INSECT INVESTIGATIONS

ANNUAL INVESTIGATIVE REPORT FOR 1937

AND PROGRAM FOR 1938

By

J. A. Beal, Entomologist
Forest Insect Laboratory
Fort Collins, Colorado

January 1, 1938.

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FOREST INSECT INVESTIGATIONS

(Division of Forest Insects, U.S.Bureau of Entomology and Plant Quarantine)

General

Because of circumstances which could be neither foreseen nor avoided, there have been some changes in the program of the Fort Collins laboratory during the past year or two. Previously a number of projects peculiar to the plains region had been included in our program on the assumption that they would continue to receive the financial support of the Prairie States Forestry office. When this aid was withdrawn on July 1, 1936 only one study project, "The Biology and Control of Borers in the Great Plains" was continued with regular Bureau money. The sudden increase in the number of barkbeetle epidemics in the Rocky Mountain region during the past year or two has resulted in increasing demands on the time of the station personnel for surveys and technical service work with correspondingly less time for research work. The transfer of Associate Entomologist L. G. Baumhofer from the laboratory to the Washington office last fall somewhat handicapped the work on some projects and will probably terminate some others such as the "Study of Pine Tip Moths in Forests and Plantations and Their Control by Means of Native Parasites" for which Mr. Baumhofer was largely responsible. The addition of Dr. Donald DeLeon to the laboratory staff in mid-January 1938 will permit the continuance of other regular station projects and the possible addition of one or two new projects which should be undertaken.

Project:

Forest Insect Surveys (h-1-13)

Object:

These surveys are made for the purpose of locating and determining the status of insect pests of the forest. They also furnish the basis for information and advice given to land managing agencies when planning and conducting necessary control work.

Status:

Formerly the surveys were financed by the land managing agencies with the technical assistance and cooperation of the Bureau. During 1937 some money for surveys was allotted directly to the Bureau and as a result more definite and systematic planning of this work has been made possible. In 1937 the Bureau conducted extensive surveys on barkbeetle infestations on the Denver Mountain Parks area, the Roosevelt National Forest and parts of the Pike and Arapaho National Forests in Colorado, the Medicine Bow and Bighorn National Forests in Wyoming, and the Dixie National Forest in Utah. In addition, the Forest Service made less complete surveys on the Powell, Ashley, Wasatch, and Uinta National Forests in Utah, and the Park Service surveyed Bryce Canyon National Park in Utah.

Plans:

Because of sudden and unexpected increases in some infestations complete survey plans cannot be made for even one year in advance, for additional areas on which we have no information now will

undoubtedly require an extensive survey by next fall. However, such areas as the Denver Mountain Parks, the Roosevelt National Forest, the Medicine Bow National Forest, the Powell National Forest, Bryce Canyon National Park, and Rocky Mountain National Park will require surveys during 1938. Additional areas will undoubtedly be added to this list by next summer.

Assignment:

J. A. Beal and temporary field assistants.

Project:

Investigation of the Biology and Control of the Black Hills beetle, Dendroctonus ponderosae Hopk. (h-1-1)

Object:

These studies are designed to furnish information on the life history, seasonal history, and habits of the Black Hills beetle and important associated insects. This information has a very practical application since it assists in determining when control is necessary, how it can best be applied, and when it is most effective.

Status:

This project was begun in the summer of 1935 upon establishment of the Fort Collins laboratory. Information has been gathered each year through a series of periodic collections made from cages placed on infested trees. About one hundred and fifty cages have been installed on lodgepole pine and limber pine at elevations of eight, nine, and ten thousand feet on Elk Mountain, Wyoming, and at eight thousand feet on ponderosa pine at Wah Keeney Park, Colorado. Supplementary brood counts have been made on a large number of felled infested trees at each location. Permanent sample plots have been laid out in the Elk Mountain infestation.

Plans:

The continuance of this study depends entirely upon the status of infestations by the Black Hills beetle and upon control work

performed upon them by land managing agencies. During 1938 the collections will be continued from the Elk Mountain and Wah Keeney Park cages. It may also be possible to extend this study by establishing cages on other infested areas and it is hoped that newly infested trees can be caged in the ponderosa pine type. The sample plots already established will be re-cruised.

Assignment:

Donald DeLeon.

Project:

Investigations on the Effects of Low Winter Temperatures on Overwintering Broods of the Black Hills beetle, Dendroctonus ponderosae Hopk. (h-1-6)

Object:

To determine whether or not the low winter temperatures encountered in the Rocky Mountain region have any lethal effect on overwintering broods of the Black Hills beetle and if so to what extent they may be relied upon to reduce the population of this insect.

Status:

This project was started during the winter of 1936-37 when refrigeration apparatus was acquired. A number of tests was run with naked larvae to determine seasonal differences in cold hardiness. Tests were also run to determine the effect of three hosts -- lodgepole pine, ponderosa pine, and limber pine -- on cold resistance of larvae taken from them. A few tests were run to determine the critical temperatures in relation to stage of development of the insect. These preliminary tests indicate that D. ponderosae is a very hardy insect and that low temperatures may not be an important limiting factor.

Plans:

All low temperature tests which were made last year will be repeated this year so as to obtain more conclusive evidence. In addition brood from different parts of the region will be

tested for any possible variation in cold resistance which might be attributed to different localities.

Assignment:

N. D. Wygant.

Project:

Investigations of the Biology and Control of Borers Affecting Trees Planted in the Shelterbelt. (h-1-3)

Object:

To obtain pertinent information on the life history and habits of certain destructive wood-boring insects injurious to trees planted in the Great Plains region and to develop suitable methods for their control.

Status:

During the past three years a large number of borer-infested trees has been treated by spraying the trunks with chemicals which appeared most promising from the standpoint of borer control. Some chemicals have been eliminated because of injury to the trees, others because of unsatisfactory kill of borers. One of the penetrating creosote products appears most promising against Tylonotus bimaculatus larvae. Last season more emphasis was placed on a study of the vigor of infested and non-infested trees in order to determine the cause of borer attack. The data obtained indicated that this type of insect damage was usually associated with weakened trees or those growing under adverse conditions. Some infested trees on dry sites were watered in an attempt to stimulate growth and prevent damage by borers.

Plans:

Tests with the most promising chemicals and possibly some untried

chemicals will be continued this year on a limited scale. Additional data will be obtained on the predisposing factors which make conditions favorable for borer attack. Additional tests will be made in an attempt to stimulate tree growth and vigor through watering and the use of fertilizers.

Assignment:

N. D. Wygant.

Project:

A Study on the Effect of Climate on Epidemics of the Black Hills Beetle, Dendroctonus ponderosae Hopk. (h-1-6)

Object:

To determine if there is any correlation between outbreaks of the Black Hills beetle and climatic factors, such as drought, excessive rainfall, or abnormally cold winters.

Status:

This project can best be handled through a comparison of the history of known outbreaks with climatic conditions occurring during those periods and as recorded in the available weather records. Only a very small beginning was made on this project last winter through the assembling of some weather data and records of past outbreaks.

Plans:

Additional weather data which might have a bearing on outbreaks of the Black Hills beetle will be collected during the winter months as time permits.

Assignment:

J. A. Beal.

Project:

Investigations on the spruce budworm (*Cacoecia fumiferana* Clems.) (h-1-2)

Object:

To obtain information on biology and control of this important defoliator of firs and especially on the variety which was found severely injuring ponderosa pine for the first time in this region this year.

Status:

A few preliminary observations were made on this insect last year and some data were collected on its habits, character of injury, and extent of damage. The epidemic tendency of the spruce budworm on firs has increased during the past two years and its work on ponderosa pine is a new but apparently very important discovery which needs further investigating.

Plans:

Additional data will be collected on the life history, habits, nature and extent of injury of this insect, particularly on pines, and on its associated parasites and predators. Sample plots will be laid out in some of the most seriously affected areas.

Assignment:

J. A. Beal.

Project:

Investigations on the Pandora Moth, Coloradia pandora Blake. (h-1-2)

Object:

The purpose of this study is to obtain information on the biology of the pandora moth in the Colorado region and particularly to determine the extent of injury which this insect causes to lodgepole pine timber.

Status:

This is a new project on which almost no work has been done. A serious outbreak was found for the first time last summer in lodgepole pine. A number of specimens was collected for rearing and for parasite material. A general reconnaissance examination was made of the infestation.

Plans:

Sample plots are to be laid out in areas which show different amounts of defoliation and these will be checked annually to determine the effect of defoliation on the trees. General biological studies will be continued and a study of native parasites begun. It may even be possible to successfully introduce Compsilura in this area and it is planned to attempt it.

Assignment:

Donald DeLeon.

Project:

Technical Assistance on Insect Outbreaks and Control Projects. (h-1-13)

Object:

To assist foresters and others interested in the conservation and protection of timber in identifying forest insects which may be found causing damage and to aid in plans for their control where necessary.

Status:

Although this type of work can hardly be called a study project it is very important as part of the duties of the laboratory personnel and as such should be listed here. It usually takes the form of a general survey or inspection of questionable areas where damage to forests has been noted. Short memoranda are furnished the land managing agencies by the Bureau after each inspection and the recommendations contained therein are almost invariably followed. During the past year many such examinations were made and advice given concerning destructive insects found on a number of areas too numerous to be listed here in detail. They included many National Forest areas, some National Park areas, some Indian Service areas, and some private areas.

Plans:

It is absolutely impossible to make plans for this type of work.

Assignment:

J. A. Beal, Donald DeLeon, N. D. Wygant.